

Glossary

Active Dewatering – Lowering the water table by pumping and extraction or other water-removal methods.

Acute Exposure – Based on the exposure model developed for RMA, an exposure duration of 1 to 14 days.

Agent – A solid, liquid, or gas that through its chemical properties produces lethal or damaging effects on man, animals, material, or plants or that produces a screening or signaling smoke. Examples of chemical agents at RMA include Sarin (GB), a nerve agent, and mustard (HD), a blistering agent.

Agent Monitoring – Analytical technique used during excavation to survey soil for the presence of Army chemical agent.

Agricultural Practices – A process that involves tilling the soil with farm machinery and seeding it with locally adapted vegetation in a manner consistent with RMA refuge management plan. Agricultural practices have been shown to reduce the level of surficial soil contamination.

Air Monitoring – Collection of air samples that are analyzed for key contaminants to ensure that allowable concentrations are not exceeded.

Air Stripping – As it applies to groundwater treatment, extracting contaminated groundwater and pumping to an air stripper, which is a tall, hollow vessel. The water is pumped to the top of the vessel and allowed to splash down to the bottom. As the water passes through the air, contaminants are transferred from the water to the air, which is in turn treated before it is discharged to the atmosphere.

Alternative – An option for cleaning up a site.

Applicable or Relevant and Appropriate Requirements (ARARs) – Federal and state legal requirements that a selected remedy for a site will meet, such as allowable levels of chemicals in water.

Bioaccumulation – The amplification of the concentration of a chemical between the initial source (e.g., water, soil, or sediment) and a specified target species or trophic box. A bioaccumulative chemical can increase in concentration in a living organism as the organism breathes contaminated air, drinks contaminated water, or consumes contaminated food.

Biomagnification – The process by which tissue concentrations of bioaccumulative chemicals increase as a chemical passes up the food chain (e.g., from plant to insect, mouse, and hawk). It is measured as the ratio of the concentration of a chemical in an organism to the concentration in the diet of the organism.

Boundary System – Groundwater extraction, containment, and treatment system at RMA boundaries. There are three such systems, the Irondale, Northwest, and North boundary systems.

Cap – An in-place containment technology. The standard cap design consists of a layer of soil/vegetation, a crushed layer of concrete or cobbles, and a layer of low-permeability soil. Caps are sloped for erosion control and are vegetated with locally adapted perennial grasses and low-growing plants.

Caustic Washing – A treatment process in which agent-contaminated soil or structural debris is treated with caustic (high pH) fluids to degrade the agent compounds.

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CERCLA – Comprehensive Environmental Response, Compensation and Liability Act. Also known as Superfund, a law passed in 1980 that establishes a program to identify inactive hazardous waste sites, ensure they are cleaned up, evaluate damages to natural resources, and create claims procedures for parties remediating the sites.

Chronic Exposure – Based on the exposure model developed for RMA, an exposure duration of 7 to 30 years.

Composite Sample – A representative sample that has been combined from several samples of the same medium. In this sampling method, samples are systematically collected either vertically and/or horizontally from a medium and thoroughly mixed together to form a representative sample. Examples of composite samples are depth composites often used in subsurface soil sampling and area composites used in surficial soil sampling.

Conceptual Remedy – Agreement for a Conceptual Remedy for the Cleanup of the Rocky Mountain Arsenal. Signed by the Parties on June 13, 1995, it outlines the general approach for the remediation of RMA. The Conceptual Remedy was the result of dispute resolution (as provided in the FFA) and formed the basis for the Detailed Analysis of Alternatives report and Proposed Plan.

Consolidation – Movement of soil with low levels of contamination to areas proposed for capping or covering. The consolidated soil is placed underneath the cap or cover to develop slopes so that surface-water runoff can be controlled and collected.

Containment – A remedial action that interrupts exposure pathways through the use of physical barriers and reduces the spread of contamination.

Contaminant of Concern (COC) – A chemical selected for evaluating potential human or animal health effects. Selection is based on concentration, toxicity, and site-specific information.

Cover – A layer of clean soil that isolates contamination in place, thereby preventing exposure to humans and animals. A soil cover consists of a variable thickness layer of soil and may include crushed or formed concrete layers as biota/excavation barriers. Soil covers may be sloped for erosion control and are vegetated with locally adapted perennial grasses and low-growing plants.

Detection Limit – The lowest concentration of a chemical that can be distinguished from the background response of an analytical instrument.

Dismantling – Controlled demolition of a structure using heavy equipment. Contaminants are not treated in this process, but the volume of structural material is decreased and converted into a more workable form for disposal.

Dust Controls – An action, such as spraying water or foam, used to control the emission of dust (e.g., during excavation activities).

EPA Paint Filter Test – A test that demonstrates the presence or absence of free liquid in waste material to be landfilled (based on a test method in SW 846, Method 9095).

Ex Situ – Not in the original place (Latin). With reference to hazardous waste treatment, this refers to excavation or extraction from the ground prior to treatment.

Excavation – The removal of soil, debris, drums, pipes, tanks, or any other solid material from the ground.

Exposure Duration – The amount of time a receptor is exposed to a chemical.

Exposure Pathway – The pathway a chemical travels from the source to the individual. At RMA, two pathways were evaluated, direct (consuming, contacting, or breathing contamination) and indirect (breathing contaminated vapors).

Extraction System – A system of wells used to remove groundwater from an aquifer.

Feasibility Study (FS) – An investigation that recommends the selection of a protective, cost-effective alternative for remediation. It usually is begun during the Remedial Investigation (RI); together these investigations are commonly referred to as the RI/FS.

Federal Facility Agreement (FFA) – A legal document that sets the framework for cleanup at RMA.

Gas Chromatography/Mass Spectrometry (GC/MS) – A laboratory analytical method used to detect organics in soil or water.

Geophysical Survey – A technique used to locate buried metal, such as unexploded ordnance, using nonintrusive instruments that measure various properties of subsurface materials.

Granular Activated Carbon (GAC) – A treatment method used to remove organic chemicals from contaminated groundwater.

Habitat Modifications – The exclusion of biota from contaminated areas by installing physical barriers (e.g., a chain-link fence) or changing the quality of the habitat (e.g., sowing grasses that are less attractive to biota as an environment in which to live).

Hazard Index (HI) – A value that represents the summation of hazard quotients for a particular chemical for all exposure pathways evaluated.

Hazard Quotient (HQ) – The ratio of the estimated actual daily chemical intake (dose) to the estimated allowable daily intake that is not likely to cause adverse health effects.

Hazardous Waste Landfill – A secure disposal facility that is specially designed, operated, closed, and monitored to control the potential release of hazardous substances into the environment.

Horizontal Well – A well that is drilled with a major portion of its length parallel to the ground surface and that could be used to capture contamination in plumes.

Human Health Exceedance – At RMA, soil posing risk to human health as determined by concentrations of chemicals present above action levels developed in the Integrated Endangerment Assessment/Risk Characterization for carcinogens (an excess lifetime cancer risk of 10^{-4}) and noncarcinogens (a hazard index of 1.0).

Hydrology – The science dealing with the properties, distribution, and circulation of water.

ICP Metals – Metals detected by Inductively Coupled Plasma, a laboratory analytical method.

Implementability – The ability to execute and complete the remedial actions required under an alternative. Evaluation of implementability includes, for example, considering the availability of materials and skilled workers.

In Situ – In the original place (Latin). With reference to hazardous waste treatment, this refers to treatment in the ground (i.e., without excavation or extraction).

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In Situ Biological Treatment – An in-place biodegradation process that takes advantage of the naturally occurring micro-organisms in the aquifer. Oxygen and nutrients containing nitrogen are added to the aquifer so that organisms grow more numerous. As the population increases, the organisms turn to the contamination present in the aquifer as a source of food, thereby breaking down and destroying the contamination.

In Situ Vitrification – A thermal treatment process using electrical current to melt soil or sludges in place, resulting in a chemically inert and stable glass product.

Incineration – A treatment technology involving destruction of waste or contamination by controlled burning at high temperatures.

Inorganic – Pertaining to or composed of chemical compounds that do not contain carbon as the principal element, i.e., matter other than plant or animal.

Interim Response Action (IRA) – A remedial measure that is implemented in an expedited time frame before the final remedy and that has been determined to be necessary and appropriate for the site.

Maximum Contaminant Level (MCL) – The maximum permissible level of a contaminant in water delivered to users of a public water system as specified in the Safe Drinking Water Act. MCLs are enforceable water-quality standards and are applicable or relevant and appropriate requirements for groundwater remediation.

Medium (*pl. media*) – A specific environment such as groundwater, surface water, soil, sediment, or air.

Medium Groups – Similarly contaminated soil sites, groundwater plumes, or structures.

Migration Pathway – The way in which a chemical moves through the environment. For example, a constituent in soil may be susceptible to transport by wind suspension as fugitive dust, by alluvial erosion during periods of seasonal and/or episodic surface-water runoff, or by dissolving in infiltrating rainwater.

Multi layer Cap – A cap that prevents exposure to humans and animals by isolating the contamination. From top to bottom, it generally consists of three layers: a 4-ft-thick soil/vegetation layer, a 1-ft-thick layer of crushed concrete or cobbles, and a 2-ft-thick layer of compacted low-permeability soil to provide long-term minimization of infiltration.

Munitions Screening – Technique used prior to excavation to survey soil for the presence of munitions (weapons and ammunition) and/or munitions debris.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) – The federal regulations that govern the implementation of CERCLA.

National Priorities List – A list published by the U.S. Environmental Protection Agency that ranks all of the CERCLA sites in order of priority for remediation.

Operable Unit – Term for a geographic area or a separate activity undertaken as part of a cleanup conducted under CERCLA.

Organic – Pertaining to or composed of compounds that contain carbon as a principal element.

Organizations – The U.S. Army, U.S. Environmental Protection Agency, U.S. Agency for Toxic Substances and Disease Registry, U.S. Fish and Wildlife Service, U.S. Department of Justice, and Shell Oil Company. They signed the Federal Facility Agreement.

Parties – U.S. Department of the Army, Shell Oil Company, State of Colorado, U.S. Environmental Protection Agency, and U.S. Fish and Wildlife Service. They oversee the remedial process at RMA.

Passive Dewatering – Lowering the water table without actively removing the water by pumping and extraction or other methods. It is accomplished by limiting the infiltration of water across an area using controls such as a cap or cover or elimination of water utilities.

Plume – An area of contaminated groundwater containing one or more chemicals at concentrations that exceed remediation goals.

Preliminary Pollutant Limit Value (PPLV) – Risk-based concentrations of chemicals in soil that are considered protective of human health given a defined set of exposure and toxicity assumptions.

Principal Threat Exceedance – At RMA, soil that is considered to be highly toxic or highly mobile that would pose a significant risk to human health should an exposure occur (i.e., more than 10^{-3} excess lifetime cancer risk or a hazard index of 1,000).

Probabilistic PPLVs – Risk-based concentrations of chemicals in soil developed to represent the likelihood of a potential effect on an organism as a result of exposure to a chemical constituent. In a probabilistic evaluation, a range of input values can be assigned to reflect variability, the shape of the range defined, and a prescribed certainty assigned to a range of results, thereby providing an informed context within which risks can be managed. At RMA, for example, the use of a 5th percentile preliminary pollutant limit value (PPLV) would protect 95 percent of an exposed human population.

RCRA-Equivalent Cap – A cap with physical barriers that achieve the performance standards of a cap as described in the Resource Conservation and Recovery Act, a law that regulates the management of hazardous waste from point of generation to disposal. A multilayer cap was assumed to be RCRA equivalent in this ROD for purposes of costing alternatives.

Receptor – The animal or person for which potential exposure and risk to a chemical is evaluated.

Record of Decision (ROD) – A public document that records and explains the cleanup alternative(s) to be used at a CERCLA site. It is based on information from the Remedial Investigation/Feasibility Study, public comments, and community concerns.

Remedial Investigation (RI) – A study that reports the types, amounts, and locations of contamination at a site.

RF Heating – A thermal treatment process using radio frequency (RF) energy to heat soil in place, volatilizing contaminants, which are collected at the ground surface.

Slurry Wall – A buried vertical barrier commonly made of a soil and bentonite clay mixture.

Soil Cover – See Cover.

Soil Posing Risk to Biota – Area containing a potential risk to biota as defined by a hazard quotient greater than 1.0. The hazard quotient is calculated using a biota risk model based on an animal's foraging range (the average area over which they obtain their food). "Biota" refers to wildlife.

Soil Vapor Extraction – Removes volatile compounds from contaminated soil in the unsaturated zone by applying a vacuum using vapor extraction wells and blowers. Vacuum blowers induce air flow through the soil matrix, stripping volatile compounds from the soil. Contaminated vapor is withdrawn through extraction wells,

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collected, and treated. Enhanced soil vapor extraction may use heating elements to include removal of some semivolatile compounds.

Soil Venting – A technique used to extract contaminated vapors from soil above the water table, usually by applying a vacuum to a system of wells.

Solidification/Stabilization – A process in which a hardening agent (such as cement) is combined with contaminated soil. The mixture is allowed to harden, fixing the contaminants in a less leachable form.

Subchronic Exposure – Based on the exposure model developed for RMA, an exposure duration of 2 weeks to 7 years.

Supplemental Field Study (SFS) – An assessment designed to determine whether potential risk to wildlife is present in the area peripheral to the center of RMA.

Surface Heating – General technology name for soil treatment technologies that involve heating soil to volatilize contaminants. During treatment, volatile and semivolatile organic compounds are vaporized from the solid phase and either recovered or destroyed by an off-gas treatment system.

TCLP – Toxicity Characteristic Leaching Procedure. A test used to evaluate whether a waste exhibits characteristics of toxicity as specified in the Resource Conservation and Recovery Act.

Thermal Desorption – A process that uses heat to vaporize (desorb) contamination from solid materials. The air stream generated during the process is treated to remove the contaminants.

Transportation – The movement of structural, soil, or liquid material from a site to disposal or treatment facilities.

Unexploded Ordnance (UXO) – Generic term for military munitions that are potentially active. Munitions are filled with high explosives (HE-filled) or chemical agent.

Unsaturated Zone – The subsurface zone above the water table. Also known as the vadose zone.

Use History – Narratives (e.g., plant operational records, official Army and Shell histories, depositions from operating personnel) that describe how a particular structure was used during its operational history. To focus investigations at RMA, structures were grouped into similarly contaminated (or uncontaminated) medium groups based on use histories.

Vapor- and Odor-Suppression Measures – Vapor-suppressing materials, such as foam or liners, or a transportable structure, used during excavation to control emissions of odors and gases.

Volatile – A chemical constituent that readily evaporates (volatilizes) from a solid or liquid state to a gaseous or vapor state. This process may be enhanced by applying heat or reducing pressure or by a combination of these processes.